

In the Claims:

Please cancel claims 17-34, without prejudice, and amend claims 1-11 and 13-15 as follows:

1. (Currently Amended) A device interface apparatus having a physical layer, a link layer, a transport layer and an application layer, for transferring commands and data in packet format by serial transmission between a device and a host, the interface apparatus comprising:

a receive FIFO disposed at the transport layer and configured to store storing on a first-in first-out basis a command packet or a data packet received from the host via the physical layer and the link layer;

a command detector configured to detect ~~detection circuit detecting~~ the command stored in the receive FIFO during data transfer and to output ~~outputting~~ a command detection signal;

a receive task file register disposed at the application layer and configured to load ~~loading~~ the command content of the receive FIFO;

a send task file register disposed at the application layer and configured to load ~~loading~~ a command or data for packet sending;

a send FIFO disposed at the transport layer and configured to store ~~storing~~ on a first-in first-out basis the content of the send task file register, the send

FIFO causing a command packet or a data packet to be sent to the host via the link layer and the physical layer;

an available time ~~generator configured to generate~~~~generation-unit~~ generating an available time for receiving another command packet from the host during data transfer; and

a mid-transfer command ~~processor~~~~processing-unit~~, when a command packet is received from the host during the available time, ~~configured to suspend~~suspending the data transfer to decode the received command for execution of processing and thereafter ~~to resume~~resuming the data transfer.

2. (Currently Amended) The interface apparatus according to claim 13, wherein

the mid-transfer command ~~processor comprises a~~~~processing-unit is~~ firmware implemented by execution of a program, and wherein

the mid-transfer command ~~processor~~~~processing-unit~~ comprises:

a suspend ~~processor~~~~processing-unit~~, when the command detection signal is output from the command ~~detector~~~~detection-circuit~~ for the command packet received during the available time and stored in the receive FIFO, ~~configured to suspend~~suspending the currently executed data transfer and ~~to save~~saving parameters upon the suspension into a memory;

a command ~~decoder configured to decode~~~~decoder unit decoding~~ the command content loaded from the receive FIFO into the receive task file register;

a data transfer abort ~~module~~~~unit~~, when abortion of the data transfer is determined by the command ~~decoder unit~~~~decoder~~, ~~configured to discard~~~~discarding~~ the currently executed command and the saved parameters and ~~to terminate~~~~terminating~~ the data transfer; and

a transfer resume ~~unit~~~~module~~, when continuance of the data transfer is determined by the command ~~decoder unit~~~~decoder~~, ~~configured to throw~~~~throwing~~ the command content of the receive task file register into a command queue, ~~to store~~~~storing~~ command reception response information into the send FIFO and sending a command reception response packet to the host via the link layer and the physical layer, the transfer resume ~~module configured to~~~~unit~~ thereafter ~~release~~~~releasing~~ the suspend of the data transfer and ~~to set~~~~setting~~ the saved parameters to resume the data transfer.

3. (Currently Amended) The interface apparatus according to claim 1, wherein

the available time ~~generator is configured to detect~~~~generation unit detects~~ completion of the transfer of the data packet sent to or received from the host ~~and to generate~~  
~~thereby set certain available time~~ upon detecting the completion.

4. (Currently Amended) The interface apparatus according to claim

2, wherein

the transfer resume module is configured to rewrite~~unit rewrites~~ the data stored in the send FIFO upon suspending of data transfer into response data to the received command for transfer of a command reception response packet, the transfer resume module is configured to~~unit~~ thereafter to set~~setting~~ the saved parameters to resume the data transfer.

5. (Currently Amended) A device interface apparatus for transferring

commands and data in packet format by serial transmission between a device and a host, the interface apparatus comprising:

a receive FIFO configured to store~~storing~~ on a first-in first-out basis a command packet or a data packet received from the host;

a command detector configured to detect~~detection circuit detecting~~ the command stored in the receive FIFO during data transfer and to output~~outputting~~ a command detection signal;

a receive task file register configured to load~~loading~~ the command content of the receive FIFO;

a send task file register configured to load~~loading~~ a command or data for packet sending;

a send FIFO ~~configured to store~~ storing on a first-in first-out basis the content of the send task file register and ~~to cause~~causing a command packet or a data packet to be sent to the host;

an available time ~~generator configured to generate~~generation unit generating an available time for receiving another command packet from the host during data transfer; and

a mid-transfer command ~~processor~~processing unit, when a command packet is received from the host during the available time, ~~configured to suspend~~suspending the data transfer to decode the received command for execution of processing and thereafter ~~to resume~~resuming the data transfer.

6. (Currently Amended) The interface apparatus according to claim 1~~5~~, wherein

the mid-transfer command processing unit is firmware implemented by execution of a program, and wherein

the mid-transfer command ~~processor~~processing unit comprises:

a suspend ~~processor~~processing unit, when the command detection signal is output from the command ~~detector~~detection circuit for the command packet received during the available time and stored in the receive FIFO, ~~configured to suspend~~suspending the currently executed data transfer and ~~to save~~saving parameters upon the suspension into a memory;

a command ~~decoder~~ configured to ~~decode~~~~decode-unit~~ decoding the command content loaded from the receive FIFO into the receive task file register;

a data transfer abort ~~module~~~~unit~~, when abortion of the data transfer is determined by the command ~~decoder~~~~decode-unit~~, ~~configured to discard~~~~discarding~~ the currently executed command and the saved parameters and ~~to terminate~~~~terminating~~ the data transfer; and

a transfer resume ~~module~~~~unit~~, when continuance of the data transfer is determined by the command ~~decoder~~~~decode-unit~~, ~~configured to throw~~~~throwing~~ the command content of the receive task file register into a command queue, ~~to store~~~~storing~~ command reception response information into the send FIFO and ~~to send~~~~sending~~ a command reception response packet to the host, the transfer resume ~~module~~~~unit~~ thereafter ~~configured to release~~~~releasing~~ the suspend of the data transfer and ~~to set~~~~setting~~ the saved parameters to resume the data transfer.

7. (Currently Amended) The interface apparatus according to claim 56, wherein

the available time ~~generator is configured to detect~~~~generation-unit~~ detects completion of the transfer of the data packet sent to or received from the host ~~and to generate~~  
~~thereby set certain~~ available time upon detecting the completion.

8. (Currently Amended) The interface apparatus according to claim

6, wherein

the transfer resume ~~module is configured to rewrite~~~~unit rewrites~~ the data stored in the send FIFO upon suspending of data transfer into response data to the received command for transfer of a command reception response packet, the transfer resume unit thereafter ~~configured to set~~~~setting~~ the saved parameters to resume the data transfer.

9. (Currently Amended) A packet transfer method for a device

interface having a physical layer, a link layer, a transport layer and an application layer, the device interface transferring commands and data in packet format by serial transmission between a device and a host, the device interface including:

a receive FIFO disposed at the transport layer and ~~configured to store~~~~storing~~ on a first-in first-out basis a command packet or a data packet received from the host via the physical layer and the link layer;

a command ~~detector configured to detect~~~~detection circuit detecting~~ the command stored in the receive FIFO during data transfer and ~~to output~~~~outputting~~ a command detection signal;

a receive task file register disposed at the application layer and ~~configured to load~~~~loading~~ the command content of the receive FIFO;

a send task file register disposed at the application layer and ~~configured to load~~~~loading~~ a command or data for packet sending; and

a send FIFO disposed at the transport layer and configured to store~~storing~~ on a first-in first-out basis the content of the send task file register, the send FIFO causing a command packet or a data packet to be sent to the host via the link layer and the physical layer;

the packet transfer method comprising:

an available time generation step generating an available time for receiving another command packet from the host during data transfer; and

a mid-transfer command processing step, when a command packet is received from the host during the available time, configured to suspend~~suspending~~ the data transfer to decode the received command for execution of processing and thereafter to resume~~resuming~~ the data transfer.

10. (Currently Amended) The packet transfer method according to claim 9~~11~~, wherein

the mid-transfer command processing step comprises:

a suspend processing step, when the command detection signal is output from the command detector~~detection circuit~~ for the command packet received during the available time and stored in the receive FIFO, configured to suspend~~suspending~~ the currently executed data transfer and to save~~saving~~ parameters upon the suspension into a memory;

a command decode step configured to decode~~decoding~~ the command content loaded from the receive FIFO into the receive task file register;



a data transfer abort step, when abortion of the data transfer is determined by the command decode step, configured to discard~~discarding~~ the currently executed command and the saved parameters and to terminate~~terminating~~ the data transfer; and

a transfer resume step, when continuance of the data transfer is determined by the command decode step, configured to throw~~throwing~~ the command content of the receive task file register into a command queue, to store~~storing~~ command reception response information into the send FIFO, to send~~sending~~ a command reception response packet to the host via the link layer and the physical layer, thereafter to release~~releasing~~ the suspend of the data transfer and to set~~setting~~ the saved parameters to resume the data transfer.

11. (Currently Amended) The packet transfer method according to claim 9, wherein

the available time generation step includes detecting completion of the transfer of the data packet sent to or received from the host and generating the~~setting certain available time upon detecting the completion.~~

12. (Original) The packet transfer method according to claim 10, wherein the transfer resume step includes rewriting the data stored in the send FIFO upon suspending of data transfer into response data to the received command for transfer of a

command reception response packet and thereafter setting the saved parameters to resume the data transfer.

13. (Currently Amended) A packet transfer method for a device interface transferring commands and data in packet format by serial transmission between a device and a host, the device interface including:

a receive FIFO configured to store storing on a first-in first-out basis a command packet or a data packet received from the host;

a command detector configured to detect ~~detection circuit detecting~~ the command stored in the receive FIFO during data transfer and to output ~~outputting~~ a command detection signal;

a receive task file register configured to load ~~loading~~ the command content of the receive FIFO;

a send task file register configured to load ~~loading~~ a command or data for packet sending; and

a send FIFO configured to store ~~storing~~ on a first-in first-out basis the content of the send task file register and to cause ~~causing~~ a command packet or a data packet to be sent to the host;

the packet transfer method comprising:

an available time generation step generating an available time for receiving another command packet from the host during data transfer; and

a mid-transfer command processing step, when a command packet is received from the host during the available time, suspending the data transfer to decode the received command for execution of processing and thereafter ~~to resume~~resuming the data transfer.

14. (Currently Amended) The packet transfer method according to claim ~~13~~15, wherein

the mid-transfer command processing step comprises:

a suspend processing step, when the command detection signal is output from the command ~~detector~~detection circuit for the command packet received during the available time and stored in the receive FIFO, configured to suspend~~suspending~~ the currently executed data transfer and to save~~saving~~ parameters upon the suspension into a memory;

a command decode step configured to decode~~decoding~~ the command content loaded from the receive FIFO into the receive task file register;

a data transfer abort step, when abortion of the data transfer is determined by the command decode step, configured to discard~~discarding~~ the currently executed command and the saved parameters and to terminate~~terminating~~ the data transfer; and

a transfer resume step, when continuance of the data transfer is determined by the command decode step, configured to throw~~throwing~~ the command content of the receive task file register into a command queue, to store~~storing~~ command reception

response information into the send FIFO, ~~to send~~ sending a command reception response packet to the host, thereafter ~~to release~~ releasing the suspend of the data transfer and ~~to set~~ setting the saved parameters to resume the data transfer.

15. (Currently Amended) The packet transfer method according to claim 13, wherein

the available time generation step includes detecting completion of the transfer of the data packet sent to or received from the host and ~~generating the~~ setting certain available time upon detecting the completion.

16. (Original) The packet transfer method according to claim 14, wherein the transfer resume step includes rewriting the data stored in the send FIFO upon suspending of data transfer into response data to the received command for transfer of a command reception response packet, and thereafter setting the saved parameters to resume the data transfer.

17-34. (Cancelled)